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THE PLANT DISEASE REPORTER

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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CROWN ROT AND ROOT ROT OF GUAYULE 1/

Walter N. Ezekiel

As a part of the agricultural development of the guayule plant (Parthenium argentatum) by the Intercontinental Rubber Company, experimental plantings were made in various regions. Such test fields were planted during 1927 and 1928 at several points in Texas. The Texas Station was later consulted with regard to some diseases that appeared in these one-acre plantings.

Previous records of diseases on guayule. The only disease of guayule recorded by Seymour (9) was a rust, Puccinia parthenii (Speg.) Arth. Arthur (2) records this rust in southern Texas and in Mexico on Parthenium incanum but not on guayule. In extensive observations Dr. W. B. McCallum had not observed this rust, and in his opinion the plants in the field appeared exceptionally free from diseases and completely free from insect pests.

Damping-off in the nursery caused heavy losses when the plant was first brought into cultivation. The practical answer to this problem, however, was obtained (5) in "...selection of proper nursery soil, rigid refraining from the use of manure or organic fertilizers, the selection of the proper varieties of guayule, and the strict regulation of watering.." coupled when necessary with application of copper carbonate and sand.

The work reported here was the basis for listing guayule as subject to Phymatotrichum root rot (3, 14) and to crown rot (13), and also for the recent comment (6) that "The greatest amount of available land is in southern Texas, but it will require some years' work to overcome the difficulties incident to the summer rains and the susceptibility to root rot in the soil."

Location and climatic conditions of 1927-28 test fields

The natural range of the guayule plant is limited to areas with about 10 to 15 inches annual rainfall in the Trans-Pecos region of Texas (see shaded area in figure 1) and North Central Mexico (1, 5). High rubber production by cultivated plants also has been found limited to areas with rainfall sufficient for only moderate growth, with occasional periods of still lower rainfall during which storage of rubber is encouraged (6).

The 4 test fields were at Pearsall, Dilley, Hebbronville, and Linn (figure 1), all in south Texas with a mean annual rainfall of approximately 22 inches. Under these conditions, the plants developed about 6%

1/ Published with the approval of the Director as Technical Contribution No. 766 of the Texas Agricultural Experiment Station.

This work was undertaken originally at the suggestion of Dr. W. B. McCallum, Manager, American Rubber Producers Division of the Intercontinental Rubber Company, through whose courtesy also were obtained many of the specimens examined and seedling guayule plants for inoculation experiments.

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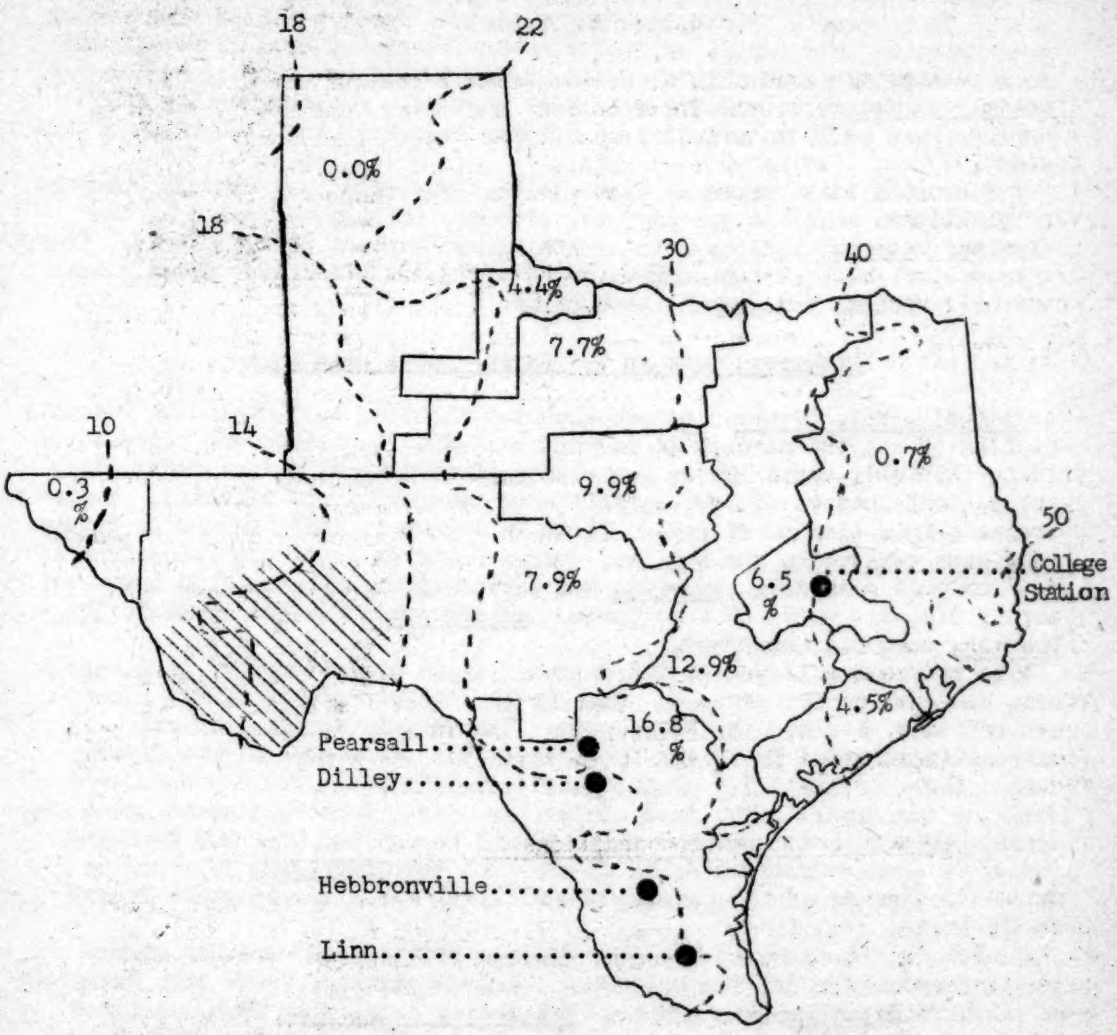

Figure 1. Location of 1927-28 test plantings of guayule in Texas. Shaded area in the Trans-Pecos region is the natural range of guayule in the United States (1); heavy broken lines indicate annual mean precipitation, in inches (7); percentage figures give estimated losses from Phymatotrichum root rot on the 1928 cotton crop (4) for the sections outlined.

of rubber. Old plants from the Dilley field, harvested in 1942, contained 5.3 to 7% rubber[2/]. Since the same varieties develop 21% or more rubber when grown in California, Dr. McCallum has suggested need of developing guayule strains especially suited to areas of higher rainfall before extending large-scale production to such regions. This suggestion will probably not apply to areas in west Texas near the natural habitat of the plant.

The moist climate of the 4 test fields, exceeding the rainfall generally considered suitable for guayule, probably influenced spread of the diseases reported here as well as the rubber content of the plants. These diseases may be less destructive under semi-arid conditions usually considered suitable for guayule production.

Diseases found in the experimental plantings

Pearsall, Frio County. An experimental planting was located at Pearsall in 1928 in a field planted to sorghum in 1927. No injury was recorded in 1928. In 1929, about 10% of the plants of variety #130 were found diseased, while plants of variety #111 were apparently not affected. Microscopic examination of diseased plants in November, 1929, showed no Phymatotrichum omnivorum, nor was this fungus found on later specimens from the Pearsall planting. Fusarium was universal in cultures from more severely diseased parts of the plants. Alternaria, and less commonly Chaetomella, were also obtained.

When the writer inspected the Pearsall field on October 17, 1930, about half the plants were injured. Usually the various shoots of the plant had not been attacked simultaneously. Characteristically, several large branches were still fresh and green while the other shoots were already dead. Such partly-killed plants scattered around the field presented a striking appearance. The dead stalks bore dark, depressed areas about the crown. Deeper roots appeared still normal though the tops had been injured, in marked distinction to plants with Phymatotrichum root rot in which the tops remain apparently normal until after considerable injury to the roots.

A number of plants were taken to College Station and used for microscopic examination and for cultures. Microscopically, there were occasional wefts of Fusarium-like hyphae. Sclerotium bataticola Taub. appeared in all cultures from dead parts of the plants while Fusarium predominated in isolations from portions of plants with less advanced injury. Inoculation experiments were carried out in 1931-1932, by the writer at College Station with 7 Fusarium isolates, and by Dr. McCallum at Salinas, California, with a few of these Fusaria, with no definite results.

The disastrous losses in the Pearsall planting were due to a disease which we have designated as "crown rot". Crown rot appears to be primarily a disease of large, vigorously growing plants. Unless the disease is very far advanced, plants with crown rot do not pull readily from the ground. When a diseased plant is dug out, it will be noticed that the

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2/ Information as to the rubber content of these plants was furnished in Dr. McCallum's letter of January 22, 1942.

injury centers around the crown. The cortex and deeper tissues are blackened and more or less decayed in this region, and the blackening of cortical tissues progresses up the affected stems frequently before there is evident injury to the main portions of the roots. Apparently individual shoots are attacked separately at the crown, rather than the whole plant. Many plants of the Pearsall planting exhibited growth cracks about the enlarged crown and infection may have occurred through such wounds.

What is perhaps the same disease had been noted by Dr. McCallum in earlier experimental plantings in Arizona and in some moist and generally unusually fertile soils in California. Variety #109 appeared somewhat resistant to this disease and also to a disease which attacked plants in manure-fertilized test plots.

Linn, Hidalgo County. Diseased plants from Linn were examined in September, 1930. These samples represented a disease that had attacked large groups of 20 to 50 plants. The symptoms were definitely not of Phymatotrichum root rot. There were traces of root injury high on the roots, and vascular darkening. Individual shoots of some plants were dead, with other portions, including the roots, still normal. Microscopic examination showed no Phymatotrichum omnivorum. Occasional lesions high on the roots bore Fusarium macroconidia. Cultures from surface-sterilized portions of the crowns yielded no growth. The injury was tentatively considered crown rot, as at Pearsall.

Hebbronville, Jim Hogg County. Information about the planting at Hebbronville was recorded (by Dr. McCallum) on March 23, 1931: "The growth is in excess of the plants you saw at Dilley, but I could not find a single diseased plant. The soil is somewhat sandier than at Dilley and deeper... The Hebbronville plants were on new land while the Dilley station has been in crop for many years."

Dilley, Frio County. Plants from the 1-acre planting at Dilley, collected on September 23, 1930, were the first guayule plants seen with Phymatotrichum root rot. The plants were 8 to 9 months old. Dead plants were in small spots of 1 to 4 plants along the row. The roots had characteristic symptoms: the cortex frayed, the bottom of taproots decayed and fragile, and the upper portion (in dryer soil) sometimes normal. Microscopic examination showed occasional rather weathered strands of Phymatotrichum omnivorum (Shear) Duggar with the distinctive acicular branches arising as whorls perpendicular to a central hypha.

On October 17, 1930, the planting was inspected in detail. About 6% of the plants had now been killed. The general appearance of diseased plants agreed with a diagnosis of Phymatotrichum root rot. The lower portions of the roots were decayed; however, hand-lens examination did not disclose typical strands of the fungus. Definite P. omnivorum was found in later microscopic examination on the roots of only 1 of 7 plants. The fungus apparently caused decay some months before and the strands on the dead roots then mostly disintegrated (as usual with P. omnivorum following decay of invaded roots). With such plants the general type of injury may be more useful for rapid diagnosis, although less crucial, than search for the fungus.

The damage noted above was due to Phymatotrichum root rot. This is the only record we have of attack of guayule plants by this disease under

field conditions, although the susceptibility of guayule to P. omnivorum was amply confirmed in the inoculation experiments at College Station as given below. Information about Phymatotrichum root rot is available in numerous publications (12, 14, 8, 10). The fungus is indigenous throughout the prairies, plains, and deserts of the Southwest and Mexico, spreading from the roots of native plants to susceptible crops that may be planted. Many of these native plants are somewhat susceptible and act as carriers of the fungus but rarely succumb under natural conditions. Guayule may be among these plants that are rather resistant under semi-arid conditions. The experimental plantings in Texas were in the Rio Grande Plain in which Phymatotrichum root rot is quite prevalent and destructive (see figure 1). Root rot was seen in only one of these plantings and caused little loss (about 6%) as compared with the high percentages of cotton plants (up to 70%) killed in some nearby fields, which supports the information obtained in the inoculation experiments that guayule is less susceptible than the cotton plant.

Inoculation experiments with Phymatotrichum root rot

Four plants that had been transplanted to pots in December, 1929, were set out the following spring in the root-rot test nursery at College Station. Here they were inoculated several times during the summer with cotton roots naturally infected with Phymatotrichum root rot (11). None showed signs of injury, and they were still surviving in February, 1931, although cotton interplanted in the same nursery rows succumbed to root rot during 1930.

In March, 1931, guayule seedlings of 3 varieties were planted in the root-rot test nursery. These plants were inoculated and many succumbed to typical root rot. All 3 varieties proved susceptible, but the arrangement of the planting precludes assuming that the relative susceptibility was necessarily as suggested by Table I. Variety 109 was placed in a portion of the nursery where most successful inoculations had previously been obtained.

Table I. Results of inoculations with Phymatotrichum root rot of guayule plants set out March 25, 1931, in the root-rot test nursery at College Station, Texas.

Variety	Location in nursery	Condition of plants Oct. 12, 1931		
		Green (number)	Killed by root rot (number)	(percentage)
#109	row 11	7	11	61%
#111	row 13	11	8	42%
#593	row 15	7	2	22%
all varieties		25	21	46%

Many of the guayule plants in the nursery were still surviving in November, 1932. Lack of infection of the older plants inoculated in 1930, survival of half the younger plants inoculated in 1931, and the continued survival of remaining plants during 1932, suggest only moderate susceptibility of guayule with perhaps increased resistance of established plants. Accordingly guayule was assigned (14) a "++" rating, indicating moderate susceptibility to root rot, on a scale on which extremely susceptible plants such as cotton are designated as "++++".

It should be emphasized that these inoculation experiments were in the root-rot test nursery, with every plant inoculated several times during the season, cotton interplanted to provide additional chance of infection by spread from dying cotton plants, and periodic irrigation. These conditions facilitate rapid test of susceptibility to the disease under exceptionally favorable conditions, but will not indicate losses to be expected, for example, under semi-arid field conditions suitable for guayule.

Summary

The guayule plant (Partheniun argentatum) was attacked by 2 diseases in test plantings in south Texas. Most serious was a crown rot, cause not established, in 2 of 4 test fields. This disease caused greater loss to vigorous 3 or 4-year-old plants than to the younger ones. Some guayule varieties appeared more susceptible than others.

Root rot caused by Phymatotrichum omnivorum attacked some of the plants in one field and killed nearly half the young plants inoculated with the disease at College Station. This disease may be more severe on 1-year-old than on established, older plants.

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(TEXAS AGRICULTURAL EXPERIMENT STATION).

NOTES ON TOBACCO AND TOBACCO DISEASES IN PUERTO RICO DURING THE EARLY PART OF THE 1942-43 SEASON

H. H. Foster[1], J. Vélez Fortuño,
and G. Irizarry Rubio

During the seedbed and early field season survey trips were necessarily limited, owing to wartime conditions, to the La Plata and Caguas sub-stations. Daily observations were made at the main station of the Tobacco Institute at Río Piedras.

This year a small and late crop of tobacco will undoubtedly be harvested in Puerto Rico, because of the reduced acreage, which may reach a record low.

The Puerto Rican War Board permitted Puerto Rican tobacco farmers with A.A.A. quota of up to 0.5 acre to buy fertilizer for their total quota at the rate of 600 lb. per cuerda[2]. Tobacco farmers with an A.A.A. quota above 0.5 acre were allowed to buy fertilizer at the rate of 600 lb. per cuerda for the first 0.5 acre and an additional amount corresponding to 75% of the difference between 0.5 acre and their total quota. Normally 1000 lb., or more, of commercial fertilizer is used per cuerda.

However, the reduction in fertilizer allotments is only one of several reasons for reduced acreage this year. Even if a sufficient supply of fertilizer had been available it is highly probable that a small crop would have been harvested. Excessive rainfall has been reported from most of the

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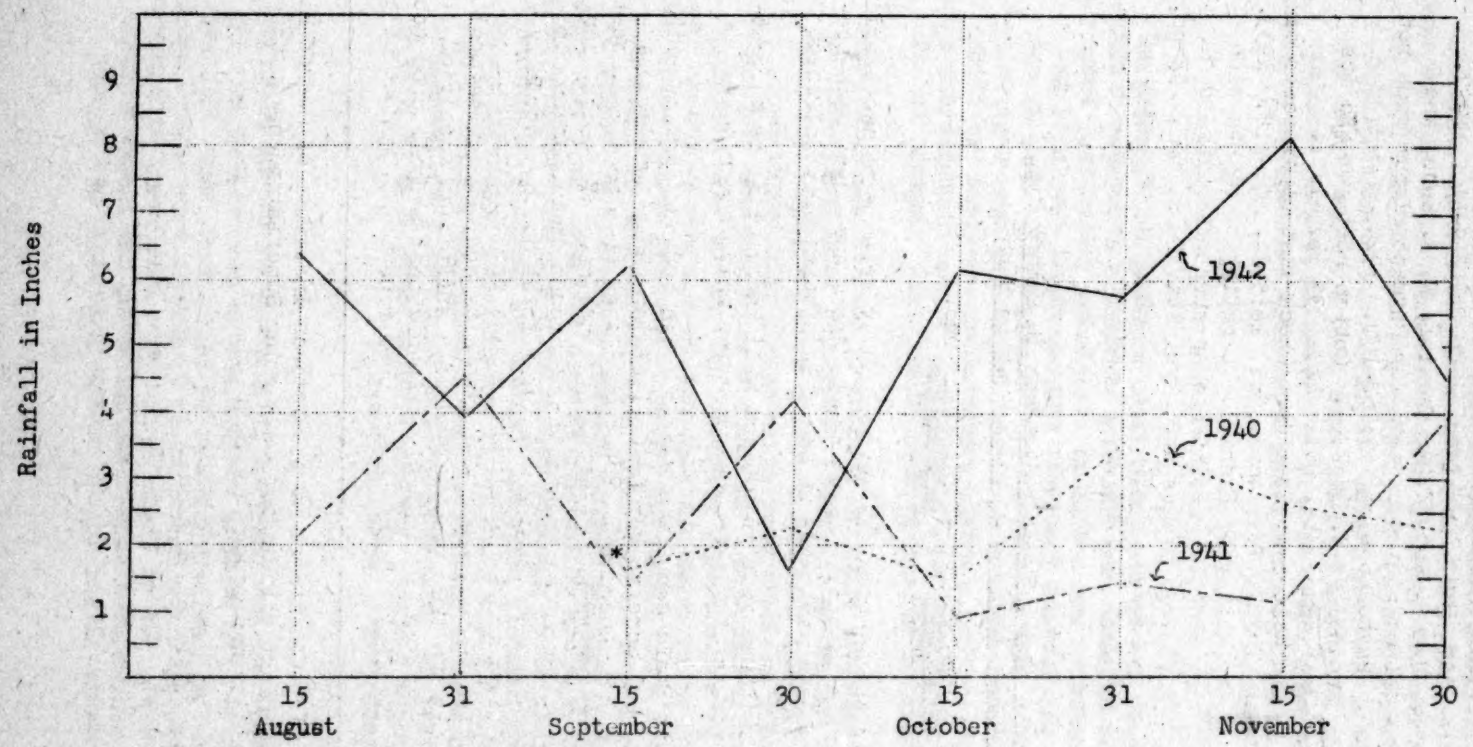
1/ Formerly Pathologist-Geneticist at the Tobacco Institute of Puerto Rico - after Feb. 1, 1943, Plant Pathologist and Acting Superintendent at the Mississippi Crystal Springs Truck Crop Station.

2/ One cuerda equals 0.9712 of an acre.



* Data not available for period from Aug. to Sept. 1940

Fig. 1 - Precipitation Data for the Seed Bed Seasons of 1940, 1941, and 1942, at Rio Piedras, P. R.

tobacco districts. Figure 1 shows the rainfall at the main station at Río Piedras during the 1940, 1941, and 1942 seedbed seasons. Most commercial tobacco seedbeds are normally sown between September and the early part of November. During most of this period the rainfall for 1942 far exceeded that for the 2 previous years. Rainfall was especially high at Río Piedras during November, totaling more than 8 inches during the first 2 weeks. Frequently rains were of a torrential nature, causing considerable damage to seedbeds and being especially destructive to plants recently set in the field.

Soil-Borne Diseases

In addition to damage due to the rain, from pounding and flooding of plants, the excessive moisture and flooding provided a favorable environment for increased activity and spread of soil-borne parasites. From reports received at the Tobacco Institute many seedbeds developed infection, some showing a high percentage of "damping-off". Many of the seedbeds at the 3 tobacco stations developed infection, some beds going out nearly 100%. Most of the symptoms observed were typical for black shank, Phytophthora parasitica var. nicotianae. Tissue inoculations made at the Río Piedras station induced typical black shank symptoms in all cases.

In one seedbed experiment, using 16 strains or varieties, black shank developed to such an extent on the small seedlings, even in Florida Rg and Puerto Rico 150 (53-A), that all seedbeds were reworked and resown. After the second sowing seedbeds were given weekly Bordeaux (4-6-50) treatments, following germination. Although these treatments did not eliminate infection it was markedly reduced. At time of transplanting to the field plots no black shank was observed in the more resistant lines such as Florida Rg and Puerto Rico 150 (53-A). However, considerable active infection was observed in the highly susceptible line of 730-4-2.

Root knot, Heterodera marioni (Cornu) Goodey, appeared this season in some seedbeds and field plots at the Río Piedras station. In a few seedbeds and in small field areas nematode infection was rather severe; galls were large and plants severely stunted. Continuous planting of tobacco over a period of several years has made it possible for nematodes to survive in the soil and weather conditions this season have favored their increase and distribution. From observations this season the root-knot disease of tobacco might become a serious problem where land is cropped continuously to tobacco over a period of years.

Viruses

Common tobacco mosaic was not observed in seedbeds at the La Plata or Caguas stations. At the Río Piedras station mosaic was present only in F_2 seedbeds reserved for mosaic-resistance breeding work, where all beds were inoculated. Some 2500 mosaic-resistant F_2 plants were transplanted to field plots but nearly 50% of these plants were lost owing to excessive rain and flooding combined with soil-borne infection and insect injury. A number of the surviving plants appear rather promising, are highly

resistant to mosaic, and show fair commercial type. Several crosses were made with Florida Rg and Puerto Rico 150 (53-A) in an attempt to combine resistance for mosaic and black shank. A number of F_2 plants show indication of carrying the desired combined resistance. Certain phases of our disease-resistance breeding program have been mentioned in previous reports (1, 2, 3). Tobacco mosaic, though present in the Río Piedras field plots, was not serious during the early field season.

"Mottle" virus was observed on an occasional field plant, during December, at the Río Piedras station. These observations are in line with those in previous recent years[3/4/5/], in that scattered "mottle" infection appears during the field season with infection tending to increase as the season advances.

Cucumber mosaic or a strain of cucumber mosaic appeared in several of the field plots at Río Piedras. During the preceding 2 seasons, 1940-41, and 1941-42, this virus was not observed. However, this year it appeared to be more prevalent than tobacco mosaic though in some cases both viruses were found to be present on the same plant, as shown by greenhouse tests. In general, cucumber mosaic, on tobacco, induced more chlorosis than did tobacco mosaic and frequently there was a tendency for greater narrowing and leaf elongation with the cucumber virus. Greenhouse inoculations from tobacco plants showing the above mentioned symptoms induced systemic infection on cucumber and N. glutinosa plants with symptoms rather typical for cucumber mosaic.

Leaf Spots

Frog-eye leaf spot caused by Cercospora nicotianae, was frequently observed on leaves of field-grown plants resulting in a high percentage of leaves showing more or less spotting. A pre-season planting of Florida Rg was severely spotted, with infection extending to the upper and younger leaves. No variety showed clear cut resistance.

Rather severe leaf spotting from Cercospora and from an Alternaria sp. was observed on leaves of field-grown plants during August and September. These were largely F_1 plants set in the field during midsummer and maturing in the fall during the normal seedbed season.

(TOBACCO INSTITUTE OF PUERTO RICO, RIO PIEDRAS).

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NOTES ON FRUIT DISEASES IN THE OZARK SECTION OF ARKANSAS IN 1942

John C. Dunegan

This report, a continuation of the summaries that have been published in the Plant Disease Survey for a number of years, deals primarily with the fruit disease situation in the northwestern section of Arkansas. However, a few reports of particular interest or importance from other portions of the State and adjacent States are also included in the discussion.

In northwest Arkansas 1942 started off with a drop in temperature to 11° below zero on January 6 and to 10 below on January 8. There was another period of zero temperatures early in February followed by periods of slowly rising temperatures alternating with sudden drops in temperature until the middle of March. The buds of various fruit trees began to expand early in April. Owing to the January freeze there was practically no crop of peaches and plums in the northwest part of the State, but the apple trees bloomed profusely and the prospects looked excellent for a bumper apple crop. These prospects were marred, however, by an excessive fruit drop which developed during May. Many blocks of Jonathan, Stayman Winesap, and Winesap were left with only part of a crop. A hail storm on May 11 caused rather extensive injury to the fruit in a restricted area around Fayetteville, thus making the problem of codling-moth control difficult in orchards damaged by the hail.

Rainfall was ample and on the whole well distributed throughout the season. There was a period of dry weather late in March before the fruit buds had expanded, but during the balance of the season there were no periods of prolonged drought and at no time did the trees show any signs of moisture deficiency.

The temperatures, even during midsummer, were for the most part below the usual seasonal levels as the result of the cooling effect of the frequent periods of rainy weather. In short, the 1942 season with ample rainfall and moderate temperature more nearly approaches the average conditions which should prevail in northwest Arkansas according to the long-time weather records.

APPLE DISEASES

Apple Scab (Venturia inaequalis): An early spring drought in northwest Arkansas with complete absence of rain from the middle of March until April 6 definitely delayed the discharge of ascospores of the scab fungus. Lesions were not found on Ben Davis leaves until April 23 and neither leaf nor fruit lesions were prevalent until the end of May. On May 21 it was noted that a majority of the scab lesions were confined to the north to northwest side of the trees. The bacterial-spot disease of the peach frequently shows this type of distribution as the result of the more favorable infection conditions prevailing on the north to northwest side of the trees, but this is the first time that the writer has observed such a distribution pattern for the apple scab fungus in Arkansas. Although there was an abundance of rainfall during the rest of the season, scab did not become a serious problem in the district. Two plots of Ben Davis trees

that were used as checks in the 1942 spray experiment had 18.0 and 23.9% of the crop (drops and harvested fruit combined) infected.

Although the development of the scab fungus was retarded on the Ben Davis variety, the leaves and fruit of the more susceptible Delicious variety were seriously affected in some orchards.

The 1942 season is an additional example of the close relationship between environmental conditions and outbreaks of the apple scab fungus in northwest Arkansas. Unless there is an abundance of rainfall accompanied by temperatures favoring infection at the very beginning of the season, the fungus does not become a serious problem in the district. The 1942 season in this respect was very similar to the 1940 and 1941 seasons.

Apple Blotch (Phyllosticta solitaria): The first specimens of blotch on the fruit were found May 28 in 1942, as contrasted with June 18 in 1941. In spite of this earlier development, the harvest results showed that the non-sprayed trees had only 40.8% of the fruit infected in 1942 as compared with 43.0% in 1941 and 49.2% in 1940. The development and spread of the fungus apparently was retarded by the comparatively low temperatures that accompanied the frequent periods of rainy weather throughout the season.

The disease caused no appreciable loss in properly sprayed commercial orchards.

Bitter Rot (Glomerella cingulata): Although no specimens were encountered in northwest Arkansas, the reports received during the season from various parts of the State indicate that the bitter rot fungus is beginning to stage a "come-back" after the dry weather of the previous decade. Specimens were received from Marianna, Ark., Naylor, Mo., and Lake Cormorant, Miss. The Missouri grower reported that most of the crop on his entire planting of Golden Delicious, Delicious, Grimes Golden, Duchess, Ben Davis, Winesap, Jonathan, and Arkansas (Black Twig) varieties was affected.

Rusts (Gymnosporangium spp.): Numerous pycnia were found April 27 on the leaves of Bechtel's flowering crab. Very few specimens were encountered on the fruit in commercial apple orchards and the rust diseases were of no commercial importance in 1942.

Black Rot (Physalospora obtusa): Aside from an occasional leaf spot noted early in the season the black-rot fungus was of little importance in 1942. At harvest time some fruit showed secondary infections due to Physalospora following codling moth injuries. This invasion of codling-moth-infested fruit is common every season, however.

Phytophthora Canker (Phytophthora cactorum): No reports or specimens of this minor trouble were received during the season. The absence of specimens was rather surprising, since the abundance of rainfall during 1942 would ordinarily be considered as favoring the development of this organism.

Brown Rot (Sclerotinia [Monilinia] fructicola): A number of mature Ben Davis apples were noted completely rotted by S. fructicola. In every instance, however, the infected fruit was on the ground under the trees. The disease has not been observed in northwestern Arkansas on fruit on the trees.

Low Temperature Injury: The drop to 11° below zero in early January did not produce any drastic tree injury such as occurred following the freeze of January 1930.

At first it was thought that the apple buds had not been injured, but a very heavy "drop" occurred late in May, causing a marked reduction in the size of the crop in some orchards. Apparently the low temperatures in January resulted in more injury than was apparent at first.

In April a nurseryman submitted a bundle of young Jonathan trees for examination. These trees showed discolored areas on the trunk and dark, elliptical, sunken spots around many of the buds. Cultures from the discolored tissues did not yield any pathogenic fungus and the injury was considered to be due to the January freeze.

PEACH DISEASES

Low Temperature Injury: The drop in temperature to 11° below zero early in January 1942 resulted in almost total destruction of the peach crop in northwest Arkansas. The temperatures did not reach so low a level in the commercial sections south of the Ozark Mountains and most of the State except the northwest section had a good crop.

Brown Rot (Sclerotinia [Monilinia] fructicola): The initial stages of apothecial development were first noted on February 27 on peach mummies, and small but fully expanded apothecia were found in the same orchard on March 23.

A few orchards in northwest Arkansas were not injured by the January 1942 freeze. One of these, a 3-year-old orchard on a north slope near West Fork, had a fair crop but unfortunately the owner did not spray the trees and by July 8 the brown-rot fungus had completely destroyed the fruit.

Growers in the Alma section encountered considerable difficulty with the brown-rot fungus in 1942. The frequent rains made spraying difficult. One grower reported losing the entire crop of a small planting of the Carman variety and other growers submitted Elberta fruit on July 22 showing typical brown rot. The situation at Alma was aggravated by the failure to control the plum curculio adequately.

Brown rot was also of considerable importance in the Clarksville area in 1942 and growers at Ozark lost so much of their crop that some men contemplate removing their trees.

Peach Scab (Cladosporium carpophilum): This disease was more prevalent than usual in the Alma and Clarksville peach sections. The rainy weather delayed spraying operations and many growers had difficulty in applying sprays at the proper time. Peach scab, although present in many commercial orchards, was at least partially controlled and did not cause any serious injury to the fruit.

Peach Rust (Tranzschelia pruni-spinosae discolor): No rust pustules were found on peach leaves at any time during the 1942 season.

Bacterial Spot (Phytomonas [Xanthomonas] pruni) was present throughout the district on the foliage but did not cause any serious defoliation in 1942. Since there was no fruit crop in the majority of the orchards, the disease caused very little damage.

Peach Leaf Curl (Taphrina deformans): The cool, rainy weather of early spring favored the development of the disease which was prevalent on all non-sprayed trees in the district. No serious damage was reported from any commercial orchard, however.

PLUM DISEASES

Bacterial Spot (Phytomonas [Xanthomonas] pruni): Typical spots were found on the leaves of the Shiro variety on April 29, but no marked defoliation developed.

Plum Rust (Tranzschelia pruni-spinosae typica): Development of the aecia on Anemone caroliniana was retarded by the cold, rainy weather and it was not until after the middle of April that open aecia were found in appreciable numbers. No uredia or telia were found on wild plums in 1942. The complete absence of the rust on cultivated and wild hosts in 1942 is one of the outstanding features of the 1942 season.

CHERRY DISEASES

Leaf Spot (Coccomyces hiemalis): The cool, rainy weather of the 1942 season favored the development and spread of this disease. Many orchards showed considerable defoliation as the result of the inability of the growers to get the sprays applied on time owing to the rainy weather.

Many wild cherry trees (Prunus serotina) were completely defoliated by the species or strain attacking this cherry. This defoliation, which was completed by the end of August, was the most extensive leaf spot injury to these native trees that I have ever encountered.

Low Temperature Injury: A nurseryman near Rogers submitted specimens of sweet cherry nursery stock showing all the aerial portion of the trees dead. At least 90% of the planting was killed as the result of the January 1942 freeze.

(DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, AGRICULTURAL RESEARCH ADMINISTRATION, U.S.D.A., COOPERATING WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION).

OBSERVATIONS ON DISEASES OF FRUITS AND VEGETABLES IN WASHINGTON

Leon K. Jones

Observations to determine the prevalence of plant diseases on many fruit and vegetable crops were made in cooperation with the Extension Service during the summer of 1942 in the following counties: Benton, Clallam, Clark, Grays Harbor, King, Kittitas, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, Whatcom and Yakima.

FRUIT CROPS

APPLE: Anthracnose (Neofrabraea malicorticis), scab (Venturia inaequalis), and powdery mildew (Podosphaera leucotricha) were generally present and destructive in Western Washington. Considerable sunscald of fruit caused by the sun and heat of early July was observed in many orchards.

LOGANBERRY, YOUNGBERRY AND BOYSENBERRY: Blighting of canes and fruit was very prevalent in many plantings. A number of factors may be associated

with this type of injury, such as: winter injury, drought, anthracnose (Elsinoë veneta), leaf spot (Mycosphaerella rubi) and cane blight (Leptosphaeria coniothyrium). Research work is necessary before the exact causal agents can be determined.

CHERRY: Brown rot (Sclerotinia sp.) [Monilinia] and leaf spot (Coccomyces hiemalis) on sour cherry and the same two diseases as well as blight (Coryneum beijerinckii) [Coryneum carpophilum] on sweet cherries were very prevalent in western Washington.

The virous or related troubles of cherry, including mottle leaf, rusty mottle, crinkle, and deep suture, were noted several times on sweet cherries in central Washington. Pink cherry was observed to be an important problem on sour cherries in western Washington.

GRAPES: Chlorosis, which shows as light colored, dwarfed foliage with various degrees of leaf killing was observed a number of times in central Washington. The cause of this trouble was not determined, although it appears that excess salt or alkali conditions in the soil may be responsible for at least part of the trouble.

Crown gall (Phytomonas [Agrobacterium] tumefaciens) was observed on above-ground parts of grape vines in Benton and Yakima counties.

PEACH: Blight (Coryneum beijerinckii) [Coryneum carpophilum] and brown rot (Sclerotinia sp.) [Monilinia] were observed to be very damaging to spurs and branches of peach in many locations in western Washington. Blight cankers were also observed in two orchards in the vicinity of Kennewick and Prosser.

Leaf curl (Taphrina deformans) was observed on leaves and fruit in a number of orchards of western Washington. Scab (Cladosporium carpophilum) was noted on the fruit in one orchard in western Washington. This disease was first recorded in Washington from another orchard in the same county in 1941.

RASPBERRY: Anthracnose (Elsinoë veneta) was observed as quite prevalent on Lloyd George and one other variety in one planting. This disease has been of no importance on the Cuthbert variety in the past, but this observation indicates that it may be of importance on some of the newer varieties.

Western rust (Phragmidium rubi-idaei) was generally present on the Cuthbert variety in Western Washington. The Washington variety appears to be very resistant to this disease.

Observations on mosaic showed that large plantings of Cuthberts are still free of green mosaic in western Washington and may be used as sources of planting stock. Plantings of the Washington variety were observed in most of the counties west of the Cascade Mountains as well as at Prosser, Wenatchee, Spokane, and Pullman. No mosaic was observed in the Washington variety although in some instances mosaic was present in nearby rows of other varieties.

A number of other varieties of raspberry have been considered to be very resistant to mosaic, including: Indian Summer, Lloyd George, Marcy,

Newburg, and Taylor. Mosaic has been observed in all of these varieties in trial plantings in central and eastern Washington and in commercial plantings of Newburg and Taylor in eastern Washington and in Lloyd George in western Washington.

Root injury, leading to death of canes and entire plants, was observed in a number of plantings. The cause of this injury was not determined, but it appeared to be associated with high water table, heavy soil or excess moisture in the soil.

Sunscald or heat burn of fruit was commonly observed in many raspberry plantings.

Blighting or drying-up of immature fruit was observed in a number of plantings. This blighting did not appear to be associated with frost or with drought that could be caused by water shortage or root and cane injury. Attempts to isolate a causal organism from affected fruit were unsuccessful.

STRAWBERRY: Only a few strawberry plantings were visited. Yellows [virus] was prevalent in most of the plantings. Black root, which may be caused by a number of factors, was observed to be very damaging in 2 plantings. Leaf spot (Mycosphaerella fragariae) was unusually prevalent in one planting.

VEGETABLE CROPS

BEANS: Halo blight (Phytomonas medicaginis var. phaseolicola) [Pseudomonas] was observed in one planting of bush beans in King county. Rust (Uromyces appendiculatus) [U. phaseoli] was observed in a number of plantings of Blue Lake or Kentucky Wonder beans.

BEET: Leaf spot (Cercospora beticola) was fairly abundant on the foliage of a number of plantings of table beets. Rust (Uromyces betae) was observed in one planting.

Downy mildew (Peronospora schachtii) occurred destructively in a number of fields. This appears to be a very important disease of beets in western Washington and practically no control recommendations are available.

Mosaic was prevalent in most fields of seed beets.

CABBAGE: Black blight (Mycosphaerella brassicicola) and white blight (Sclerotinia sp.) were observed to be destructive on plantings of cabbage for seed production.

Club root (Plasmodiophora brassicae) was very damaging in 2 fields in King county.

CELERY: Late blight (Septoria sp.) and heart rot (Botrytis sp.) were developing destructively in one large planting.

CELTUCE: Downy mildew [prob. Bremia lactucae] was observed in one planting. A determination of the causal organism was not made. Downy mildew was developing abundantly on adjacent lettuce plants.

HORSE-RADISH: One 40-acre field of horse-radish was observed in Snohomish county. Field observations indicate a high percentage of the plants were affected with mosaic. This disease was reported in 1932 from Oregon as possibly a factor in the deterioration of horse-radish plantings. It has also been under observation in Spokane since 1937.

PEAS: The virous diseases, common mosaic, severe mosaic and streak, were commonly observed in many pea plantings; in general only a trace to 5% of the plants were affected.

Downy mildew (Peronospora pisi) was observed in many fields but of little or no importance.

Blight (Mycosphaerella pinodes) was observed abundantly on 2 pea fields and was also destructive on 3 plantings of vetch.

Black spot (Cladosporium pisicola) appeared to be less prevalent than usual and only a small amount of pod and leaf spotting caused by this organism was noted.

Rust (Uromyces fabae) was collected on peas in one planting. This disease evidently is of rare occurrence in the state as only one other record occurs in the files of the Department of Plant Pathology.

POTATO: Black leg (Erwinia phytophthora) was noted as a trace to 1% in a number of fields. One field, however, showed about 10% of the plants infected.

Virous troubles, including leaf roll and rugose mosaic, were noted as very damaging in some home gardens, but relatively unimportant in the commercial plantings observed. Rolling of foliage, and erectness of stems that appears to be caused by a virus was noted to a damaging extent in a number of fields of Netted Gem in central Washington. Investigation will be necessary to determine the nature of this trouble.

Late blight (Phytophthora infestans) was very prevalent and often very destructive in many fields in western Washington.

SQUASH: Mosaic, probably caused by the common cucumber mosaic virus, was observed to be very damaging in one planting.

TOMATO: Bacterial canker (Phytomonas [Corynebacterium] michiganense) was noted as damaging one planting.

Curly top caused by the common beet curly top virus was of very little importance in fields visited in eastern Washington. A number of curly top plants were observed in 3 different plantings in western Washington.

Late blight (Phytophthora infestans) was noted in many tomato plantings of western Washington.

(STATE COLLEGE OF WASHINGTON, PULLMAN).

THE PREVALENCE AND SEVERITY OF CERTAIN POTATO DISEASES IN COLORADO DURING 1942

John G. McLean and W. A. Kreutzer

Late blight of potato (Phytophthora infestans) occurred in epiphytotic proportions in Colorado in 1942 for the first time on record. The

epiphytotic was confined to certain irrigated sections of northern Colorado, being especially severe in the late areas. Relatively small amounts of the disease were reported as occurring in Colorado in these same areas in 1941 (PDR 26:91. 1942).

Although growers were advised against the use of infected seed lots, seed piece infection was observed as early as July 15, 1942. The latter part of the growing season was characterized by low temperatures and heavy dews, which favored the spread of the disease. Vine symptoms were quite evident during the past season, but were not observed during the 1941 growing season.

While the use of Bordeaux spray and insoluble copper compounds in sprays and dusts gave some measure of control, late row irrigation and harvesting under wet conditions greatly increased the amount of tuber rot in storage. In this latter regard, Dr. Lawrence A. Schaal, Associate Pathologist, Bureau of Plant Industry, has estimated that the losses due to tuber rot in the affected areas approximate 20%. As indicated in the earlier report (l.c.), it is believed that the disease was originally introduced in seed obtained from certain north-central States.

In addition to late blight, a tuber rot caused by a species of Phytophthora as yet unidentified has resulted in considerable damage in several isolated instances on both the eastern and western slopes. The disease resembles leak of potatoes caused by Pythium debaryanum. Infection is apparently favored by relatively high temperatures and wet soil.

Early blight (Macrosporium [Alternaria] solani) also appeared in severe form throughout northern Colorado where it is endemic to the region. The use of copper sprays and dusts in a plot at Fort Collins, although failing to completely control the disease, somewhat delayed its development.

Finally, observations during 1942 indicated that the incidence of ring rot (Phytomonas sepedonica)[Corynebacterium sepedonicum] is declining in those areas most severely affected in past years. However, growers failing to use unaffected seed and to follow other recommended control measures have suffered some unnecessary losses.
(COLORADO STATE COLLEGE).

ASPARAGUS RUST IN ILLINOIS 1940-1941-1942

Joseph P. Fulton

In the past few years asparagus rust, caused by Puccinia asparagi DC., has been severe enough in Illinois to cause considerable damage. Beginning about 1930 the rust slowly increased in importance. It reached a peak of severity in the summers of 1940 and 1941. In 1940 large acreages in northern Illinois were completely brown by the first of August as a result of this disease. During the summer of 1941 the rust was again severe and young fields were badly damaged by midsummer.

Since the Martha Washington and the Mary Washington strains of asparagus won universal acceptance after their introduction by Norton in 1913, the rust has been generally regarded as unimportant. Until recently it had never been severe enough to warrant the consideration of any other control

measures[1]. These Washington strains were not immune, however, and the rust was frequently present on asparagus. Such states as Massachusetts, New Jersey, Wisconsin, Minnesota, and South Dakota consistently reported its presence. Occasional severe outbreaks were recorded. In 1936 Massachusetts[2] reported an estimated loss of 4% with heavy damage on Washington strains not uncommon. Estimated losses were 2% and 3% for 1934 and 1935 in the same State[3,4]. A severe outbreak of rust was observed in California[5] in 1925, while other local outbreaks were recorded in this period. Repeated mention is made of the fact that, though the Washington strains of asparagus were somewhat resistant to rust, they were by no means immune and were occasionally subject to severe injury from this disease.

During the middle of August 1941, a survey was made of most of the asparagus plantings in Illinois to determine the extent of the disease and the severity of injury in different regions. In general the rust was evident in all regions visited. Only a very few fields were observed in which no rust could be found. Although the disease was widespread, severe damage from rust was confined to the northern and eastern sections of the State near Rochelle, Rossville, Hoopeston, and Milford. In these regions, the badly affected fields were almost exclusively of the Washington strains of asparagus. In fact, little else had been planted here. In the southern region between East St. Louis and Cairo, the rust situation was quite different. Severely affected fields invariably proved to be of the Palmetto variety in old fields planted before Washington asparagus was widely used. At the turn of the century Palmetto was considered the most rust-resistant variety known. In several cases examined, the fields of Palmetto adjoined fields of Washington asparagus. In the latter variety the rust was hard to find, whereas the Palmetto usually showed severe browning and damage. The total damage in the southern region was very small. Some of this difference between regions may be accounted for by the fact that the southwestern section of the State was very hot and dry during the summer of 1941, whereas the northeastern section had abundant moisture.

The widespread abundance of the overwintering teliospores suggested the possibility of another severe attack of rust in 1942. Contrary to this expectation the rust was strikingly reduced in amount. Several fields in central and northern Illinois were watched carefully for the first appearance of the aecial stage. It was not until June 10 that any aecia were observed in northern Illinois and these were very rare. The rust was not observed in central Illinois throughout the summer. This contrasts sharply with 1941 when the first aecia were observed in central Illinois on May 5.

1/ Anderson, H. W., H. H. Thornberry, and J. P. Fulton. Use of eradicant sprays for the control of asparagus rust. Phytopath. 22:419-423. 1942.

2/ Plant Dis. Reporter Suppl. 103:179. 1937.

3/ Plant Dis. Reporter Suppl. 90:84. 1935.

4/ Plant Dis. Reporter Suppl. 96:194. 1936.

5/ Plant Dis. Reporter Suppl. 45:142. 1926.

By the first of June, 1941, uncut fields in both central and northern Illinois showed a majority of stalks with 5 to 10 aecia per stalk. By late summer of 1942 a total of not more than 50 acres in northern Illinois showed a very light infection of rust. In this same region in 1941 at least 2,200 acres were rusted in various degrees of severity.

During 1941 and 1942 a check was made to determine the importance of roadside (escape) plants in the spread of rust. Aecia were observed on roadside plants in both years and a record kept of the amount of infection. A comparison of these figures shows that infection on roadside plants was about the same in both years. On a plant-for-plant basis roadside plants showed much less infection in 1941 and much more infection in 1942 than did the field-grown plants.

A consideration of the weather conditions of the spring of 1942 sheds no light on the problem of the striking reduction in amount of rust in that year, since conditions believed favorable for the germination of the teliospores and the infection of the young asparagus stalks were recorded. Tests under controlled laboratory conditions have shown that the teliospores of this rust will germinate at temperatures between 50° and 78°F., with maximum germination at 68°. Supplementary to this work a record of the period of infection was kept in the spring of 1941 by tagging asparagus spears as they came through the ground. Maximum infection was observed when rainfall (amount unimportant) was followed by several days with a mean daily temperature between 65° and 72°F. During the spring of 1942 weather records from northern Illinois show that these conditions existed between April 27 and May 4 and between May 30 and June 12.

Since no primary infection occurred during periods in the spring considered ideal for the germination of teliospores, it seems possible that the overwintering teliospores must have been injured. An important factor in the reduction of the rust may have been an attack of the rust by its parasites. The parasite Darluca filum (Biv.) Cast. is generally associated with the rust. Often it limits the development of rust spores, and it may injure a pustule to such an extent that no viable spores are produced. The parasite also opens the way for secondary fungi which develop in profusion. During 1941 and 1942 this parasite was very abundant in most of the rust material examined. It is possible that in the fall of 1941 the telial pustules were severely injured by this parasite, and secondary fungi completed their destruction. Field observations during the winter of 1941-42 support this view. After November telial material was very hard to find. Such teliospores as were found did not prove to be viable. In contrast to this, readily viable telial material was frequently collected throughout the previous winter (See Table 1).

It is interesting to note that in 1919, in Georgia[6/], a similar marked reduction in amount of asparagus rust was observed in plantings where abundant telial material had developed previously.

It is possible to explain the epidemics of 1940 and 1941 in Illinois on the basis of environmental conditions without assuming either that new strains of the rust have appeared or that the Washington strains of asparagus have become less resistant. The rust has commonly been observed on

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6/ Plant Dis. Bull. Suppl. 8:252. 1920.

Table 1. Germination of Teliospores of Puccinia asparagi.

Dates collected at Urbana, Ill.:	Positive germination obtained on:
Winter of 1940-41	
Oct. 10	Nov. 7, Nov. 28, Mar. 16
Dec. 5	Mar. 16
Jan. 10	Mar. 18
Feb. 14	Feb. 19, Mar. 17
Mar. 7	Mar. 17
Mar. 28	Apr. 8
Apr. 21	May 20
Winter of 1941-42	
Aug. 26	No germination
Sept. 7	Jan. 13
Nov. 13	Nov. 27, Feb. 20
Nov. 17 (from Hoopeston, Ill.)	Jan. 13
Dec. 7	No germination
Very difficult to locate any teliospore material All later attempts to collect material at Urbana were unsuccessful.	
Mar. 4 (from Rochelle, Ill.)	No germination

these strains and under conditions favorable for its development has often caused injury. Field observations, however, show that the Washington strains are still much more resistant to rust than the Palmetto variety. No evidence is at hand to show that a new strain of rust was responsible for the epidemic.

In the present case ideal weather conditions were associated with a large amount of inoculum that had developed over a period of years since about 1930. Asparagus plantings in Illinois have greatly increased during recent years. These young fields, which remain uncut, furnish a place for the development of the aecial stage of the rust, and a consequent build-up in inoculum.

(UNIVERSITY OF ILLINOIS, URBANA, ILL.)

SPINACH TROUBLES IN ARKANSAS

Seth Barton Locke

Spinach acreage in Arkansas has been rapidly expanded in the last year. High prices and great demand have led to an increase in acreage in the Van Buren area of Crawford County to total roughly 13,000 acres and also to the planting of relatively small acreages in other sections of the Arkansas River Valley which had not previously been planted to spinach. As might be expected, this rapid expansion has been accompanied by troubles of a pathologic nature.

While downy mildew (caused by Peronospora spinaciae) has been a problem in most years on the spring-planted spinach, it has usually not given trouble on the fall-planted crop. This year, however, an abundant supply of moisture in the soil permitted the growers to plant much earlier than usual. This they did with the intent of obtaining an extra cutting early in the fall. However, the advance in planting date also permitted the downy mildew to reach epiphytotic proportions before the weather became cool enough to check its progress. As a consequence, from 30 to 50% of the first cutting was destroyed. When the fields near Van Buren and Ozark were visited on December 16 the disease appeared to be checked, but an abundance of oospores were found in the dead leaves around the bases of the plants.

Fusarium wilt of spinach was found (apparently for the first time in Arkansas) in one small spot in a field near Ozark, Arkansas. The organism isolated from the discolored vascular cylinders of the roots seems to fit the description of Fusarium solani, although no exhaustive study of it in culture has been made.

Another spinach trouble was observed in a field near Ozark, which appeared as numerous, tiny, circular, dead spots scattered over the leaves, excepting for the very youngest ones. No organism could be found in the lesions. It is believed that the injury has resulted from the practice of broadcasting the top-dressings of sodium nitrate over the plants. (ARKANSAS AGRICULTURAL EXPERIMENT STATION).

OBSERVATIONS ON THE PREVALENCE AND ECONOMIC IMPORTANCE OF STRIPE SMUT (USTILAGO STRIAEFORMIS) ON BLUEGRASS

E. J. Wellhausen, K. W. Kreitlow, and J. G. Leach

Stripe smut of Kentucky bluegrass (Poa pratensis L.) has been known for a long time but it has not been considered of much economic importance. In connection with a project on bluegrass improvement in cooperation with the U. S. Regional Pasture Research Laboratory, several hundred plugs of sod were taken from typical bluegrass pastures in West Virginia and planted on the Agronomy farm at Morgantown for observation. Smut made its appearance in severe form in the sod arising from many of the plugs. Plugs taken from certain pastures showed more smut than plugs from other pastures. Out of a total of 504 plugs taken at random from different pastures

throughout the state, 15% contained infected plants. This suggested a reexamination of the pastures for the presence of smut. The survey revealed that smut is very prevalent in both West Virginia and in Pennsylvania. No pastures have been found entirely free of the disease in either State and, in certain pastures, more than 25% of the plants were affected and even a casual observer could tell that smut was causing severe injury. A count made on 10 quadrats selected at random over a 3-acre area in the center of one pasture showed 25% of the plants to be affected. Many plants had been killed and all infected plants were badly stunted. Thirty-five percent of the plugs selected from this pasture in 1940 contained infected plants. Quadrat counts made on other pastures showed from 3 to 11% of the plants to be infected.

It is a common observation that rust and many leaf spots of bluegrass are less prevalent in grazed pastures than in non-grazed sod. This is to be expected where infection is local because many infected leaves would be grazed off before sporulation, thus preventing the building up of large quantities of inoculum. Smut, however, is a systemic disease and the fungus spreads through the underground stems to infect new shoots. Although the method of infection is not definitely known, it most likely does not occur on the leaves that would be consumed by the grazing animal. Because of these facts, smut is believed to be one of the most destructive diseases of bluegrass in pastures. In any program of bluegrass improvement, resistance to smut cannot safely be ignored.

(WEST VIRGINIA AGRICULTURAL EXPERIMENT STATION, MORGANTOWN, W. VA. AND U. S. REGIONAL PASTURE RESEARCH LABORATORY, STATE COLLEGE, PENNA.).

SOME PARASITIC AND SAPROBIC FUNGI OF SOUTHERN OHIO - II, III

Wm. Bridge Cooke

II

Southwestern Ohio has been visited by a number of collectors of fungi, many of whom resided in the area for parts of or most of their lives. Lea, Morgan, and C. G. Lloyd are among those remembered for their collections and reports.

Early in the twentieth century W. H. Aiken, teacher of music in the Cincinnati Public Schools and friend of C. G. Lloyd, made a collection of local leaf diseases. In many cases he collected enough material for exchange with other mycologists, amateur and professional, throughout the world. He sent material in quantity to Sydow who presumably used it in his exsiccati distributions. He had his determinations checked by prominent mycologists of the day.

Soon after the death of C. G. Lloyd, and on his retirement after 50 years of service in the Cincinnati Public Schools, Mr. Aiken became librarian of the Lloyd Library, a position which he held until his death. His specimens then became the property of the Lloyd Library and are now housed, under a loan agreement, in the Herbarium of the University of Cincinnati.

At the time of the transfer of the specimens in 1939 the writer was permitted to study the material, bring the nomenclature up to date, and identify, where possible, undetermined specimens. It was found, as a result, that the collection included a number of species of parasitic fungi not previously included in local collections of the region. While it includes about 100 records it is probably the first, and most complete to date, collection of its kind of the local mycobiota. The list follows.

The following fungi were all collected within Hamilton County, Ohio, presumably within, or at most near to, the present limits of the City of Cincinnati.

PHYCOMYCETES

Albugo amaranthi (Biv.) Kuntze on Amaranthus hybridus L.
A. candida (Pers. ex Lév.) Kuntze on Capsella bursa-pastoris (L.) Medic., Dentaria laciniata Muhl., Iodanthus pinnatifidus (Michx.) Steud., Lepidium virginicum L., Sisymbrium officinale (L.) Scop.
A. ipomoeae-panduranae (Farl.) Swing. on Ipomoea hederacea Jacq., I. pandurata (L.) G. W. Meyer.
A. portulacae (DC.) Kuntze on Portulaca oleracea L.
A. tragopogonis (DC.) S. F. Gray on Antennaria plantaginifolia (L.) Richards.
Peronospora parasitica (Pers.) Fr. on Cardamine pennsylvanica Muhl.

ASCOMYCETES

Taphrina deformans (Berk.) Tul. on Prunus persica (L.) Stokes.
Phyllachora graminis (Pers. ex Fr.) Fckl. on Gramineae.
Erysiphe cichoracearum DC. on Ambrosia artemisiaefolia L., A. trifida L., Hydrophyllum maculatum Nutt., Parietaria pennsylvanica Muhl., Pilea pumila (L.) Gray.
E. galeopsidis DC. on Scutellaria sp.
E. graminis DC. on Poa pratensis L.
E. polygoni DC. on Anemone virginiana L., Clematis virginiana L.
Microsphaera alni (DC.) Wint. on Platanus occidentalis L., Quercus sp., Syringa vulgaris L.
M. diffusa Cke. & Pk. on Symphoricarpos orbiculatus Moench.
Podosphaera oxyacanthae (DC.) DBy. on Prunus sp.
Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm. on Bidens frondosa L., Bidens sp., Taraxacum officinale Weber.
S. phytoptophila Kell. & Swing. on Celtis occidentalis infested by Phytoptus.
Uncinula circinata Cke. & Pk. on Acer saccharum Marsh.
U. necator (Schw.) Burr. on Psedera quinquefolia (L.) Greene, Vitis cordifolia Michx.

FUNGI IMPERFECTI

Cercospora canescens Ell. & Martin on Phaseolus lunatus L.
C. malvicola Ell. & Martin on Malva rotundifolia L.
C. omphakodes Ell. & Halst. on Phlox divaricata L.
C. osmorhizae Ell. & Ev. on Osmorhiza sp.
C. smilacis Thuem. on Smilax bona-nox L.
Darluca filum (Biv.) Cast. on Puccinia sp. on Carex sp.
Phoma smilacina (Pk.) Sacc. on Smilax cirrhata (Engelm.) Wats.
Phyllosticta cruenta (Fr.) Kickx var. pallidior Pk. on Smilacina racemosa (L.) Desf.
Polythrincium trifolii Kze. ex Fr. on Trifolium sp.
Ramularia geranii (West.) Fckl. on Geranium maculatum L.
R. lineola Pk. on Taraxacum officinale Weber.
Septoria caryae Ell. & Ev. on Carya alba (L.) K. Koch.
S. dioscoreae Ell. & Martin on Dioscorea villosa L.
S. scrophulariae Pk. on Scrophularia marylandica L.
S. oenotherae West. on Gaura biennis L.
S. verbascicola Berk. & Curt. on Verbascum blattaria L.

BASIDIOMYCETES

Ustilago zeae (Beckm.) Ung. on Zea mays L.
Coleosporium campanulae (Pers.) Lév. on Campanula americana L.
C. ipomoeae (Schw.) Burr. on Ipomoea pandurata (L.) G. W. Mey.
C. solidaginis (Schw.) Thuem. on Aster sp., Solidago canadensis L., S. flexicaulis L.
C. vernoniae Berk. & Curt. on Vernonia fasciculata Michx.
Gymnoconia peckiana (Howe) Trott. on Rubus villosus Ait., Rubus sp.
Gymnosporangium globosum Farl. on Crataegus sp.
G. juniperi-virginiae Schw. on Juniperus virginiana L.
Melampsora bigelowii Thuem. on Salix sp.
M. medusae Thuem. on Populus deltoides Marsh.
Phragmidium potentillae (Pers.) Karst. on Potentilla canadensis L.
P. subcorticinum (Schw.) Wint. on Rosa sp.
Pileolaria toxicodendri (Berk. & Rav.) Arth. on Rhus toxicodendron L.
Puccinia anemones-virginianae Schw. on Anemone sp.
P. asteris Duby on Aster cordifolius L.
P. bolleyana Sacc. on Sambucus canadensis L.
P. circaeae Pers. on Circaea lutetiana L.
P. convolvuli (Pers.) Cast. on Convolvulus sepium L.
P. extensicola Plowr. var. asteris (Thuem.) Arth. on Aster cordifolius L., Aster sp.; var. erigerontis Arth. on Erigeron sp.; var. oenotherae (Mont.) Arth. on Carex sp.; var. solidaginis (Schw.) Arth. on Solidago sp.
P. helianthi Schw. on Helianthus sp.
P. heucherae (Schw.) Diet. on Saxifraga virginiensis Michx.
P. hieracii (Schum.) Mart. on Taraxacum officinale Weber.
P. mariae-wilsoniae Clint. on Claytonia virginica L.
P. menthae Pers. on Monarda fistulosa L.

BASIDIOMYCETES cont.

Puccinia pimpinellae (Str.) Mart. on Osmorhiza claytonii (Michx.) Clarke, O. longistylis (Torr.) DC.
P. podophylli Schw. on Podophyllum peltatum L.
P. rubigo-vera (DC.) Wint. var. agropyrina (Erikss.) Arth. on Cimcifuga racemosa (L.) Nutt.; var. impatientis (Arth.) Mains on Impatiens biflora Walt.
P. ruelliae (Berk. & Br.) Lagerh. on Ruellia strepens L.
P. smilacis Schw. on Smilax glauca Walt.
P. violae (Schum.) DC. on Viola sp.
P. xanthii Schw. on Xanthium ?strumarium.
Puccinia sp. on Carex sp.
Tranzschelia pruni-spinosae (Pers.) Diet. on Thalictrum sp.
T. thalictri (Chev.) Diet. on Thalictrum dioicum L.
Uromyces asclepiadis (Schw.) Cke. on Asclepias syriaca L., Asclepias sp.
U. caladii (Schw.) Farl. on Arisaema dracontium Schott., A. triphyllum (L.) Schott.
U. caryophyllinus (Schrenk) Wint. on Dianthus sp.
U. hedysari-paniculati (Schw.) Farl. on Desmodium sp.
U. polygoni (Pers.) Fckl. on Polygonum aviculare L.
U. proëminens (DC.) Pass. on Euphorbia nutans Lag., E. preslii Guss.

III

As indicated in an earlier report, the species of saprobic and parasitic fungi growing in southwestern Ohio were only partially listed (Some Parasitic and Saprobic Fungi of Southern Ohio, Plant Disease Reporter 25:190-200. 1941.).

This supplement completes this list in so far as collections at the Herbarium of the University of Cincinnati are concerned. In contrast to the first list, none of this material has been reviewed or determined by specialists. The material was collected, largely by the writer, but partly by other students, as part of the requirements in the yearly course offered by Dr. Margaret Fulford in the Taxonomy of Non-Vascular Plants.

It is possible that not all the species listed here have been correctly determined, especially in the Thelephoraceae and Agaricaceae. Some uncertainly identified material has been omitted from the lists. In the case of the Agaricaceae sufficient field notes are not available for identification of more critical species.

In determining the several groups listed here the following works have been used constantly: Operculate Pezizales, F. J. Seaver's "North American Cup-Fungi"; Thelephoraceae, E. A. Burt's series of papers in the Annals of the Missouri Botanical Garden; Hydnaceae, Miller's series on the group in Mycologia, and Banker's revision; Agaricaceae, popular works on mushrooms, especially those of Hard, McIlvaine, and Atkinson; and Gasteromycetes, Coker and Couch's Gasteromycetes of Eastern North America.

Together, these lists do not give a complete picture of the mycobiota of this interesting, fairly well explored area, but it is hoped that they may add to the published lists and reports indicating that more than 1400 species of fungi may be found in the region.

Where specific substrata have not been listed, the species were found growing on earth, on humus, or on rotting sticks or logs in woodlands. The material was collected at a time when the writer, and others who made the collections, believed that no more than a very general record of substratum was needed for a knowledge of the habits and habitats of the fungi studied.

In the Hydnaceae the fructifications of some species attain large sizes. Two instances of especially large size were recorded.

On October 1, 1932 the writer's attention was called to a young (hardly more than a week old) sporophore of Steccherinum septentrionale, growing in a wound on a tree of Fagus grandifolia in the yard of Dr. Judkins near the Seven Caves, Highland County, Ohio. At that time it was still immature; the spines were hardly more than points on a smooth surface. On October 8 when it had attained its full size and maturity, the entire sporophore was "harvested". It measured 24 inches from top to bottom, 18 inches across, and 9 inches deep, and weighed 25 pounds and 5 ounces. It was kept for 72 hours in a drying oven at 150°F. and during that time lost 20 pounds of water.

In November 1936 the writer obtained from the end of a rotting Quercus log in Red Bird Hollow, Hamilton County, a specimen of Hericium erinaceum that measured 36 x 21 x 14 cm., and weighed 5 pounds and 10 ounces. The specimen lost 83.5% of its weight when dried.

ASCOMYCETES

Pezizales

Pezizaceae

Aleuria rutilans (Fr.) Gill. in a colony of Polytrichum - Hamilton Co.
Geopyxis nebulosa (Cke.) Sacc. - Adams, Hamilton Cos.
Humarina semiimmersa (Karst.) Seaver - Highland Co.
Lamprospora carbonaria (Fckl.) Seaver on burned ground - Hamilton Co.
Patella albida (Schaeff. ex Fr.) Seaver - Hamilton Co.
P. scutellata (L. ex Fr.) Morgan - Hamilton, Highland Cos.
P. setosa (Nees ex Fr.) Seaver - Highland Co.
Paxina acetabulum (L. ex Fr.) Kuntze - Adams, Butler, Hamilton, Hocking Cos.
P. fusicarpa (Ger.) Seaver - Highland Co.
P. hispida (Schaeff. ex Fr.) Seaver - Highland, Hocking Cos.
P. semitosta (Berk. & Curt.) Seaver - Highland Co.
P. subclavipes (Phill. & Ellis) Seaver - Hamilton Co.
P. sulcata (Pers. ex Fr.) Kuntze - Hamilton, Highland Cos.
Peziza abietina Pers. - Hocking Co.
P. badia Pers. ex Fr. - Hamilton Co.
P. clypeata Schw. - Hamilton, Highland Cos.
P. griseorosea Ger. - Highland Co.
P. repanda Pers. ex Fr. - Brown, Hamilton, Highland, Hocking, Jackson Cos.

Pezizaceae cont.

Peziza spissa Berk. - Hocking Co.
P. sylvestris (Boud.) Sacc. & Trott. - Hocking Co.
P. venosa Pers. ex Fr. - Hamilton Co.
P. vesiculosa Bull. ex Fr. on manure heaps - Clermont, Hamilton Cos.
P. violacea Pers. ex Fr. - Ross Co.
Plectania coccinea (Scop. ex Fr.) Fckl. - Clermont, Hamilton, Highland, Ross Cos.
P. floccosa (Schw.) Seaver - Hamilton, Highland Cos.
P. occidentalis (Schw.) Seaver - Hamilton, Highland Cos.
Pyronema omphalodes (Bull. ex Fr.) Fckl. on burned soil - Clermont Co.
Sarcosphaera coronaria Jacq. ex Schroet. - Highland Co.
Sepultaria arenicola (Lév.) Massee - Highland Co.
Urnula craterium (Schw.) Fr. - Adams, Clermont, Greene, Hamilton, Highland, Jackson, Ross Cos.

Helvellaceae

Helvella atra Oed. ex Fr. - Hocking Co.
H. caroliniana (Bosc. ex Fr.) Seaver - Hamilton Co.
H. crispa Scop. ex Fr. - Hamilton Co.
H. elastica Bull. ex Fr. - Highland, Hocking Cos.
H. infula Schaeff. ex Fr. - Hamilton Co.
H. mitra L. ex Fr. - Hocking Co.
Morchella conica Pers. ex Fr. - Jackson Co.
M. crassipes (Vent. ex Fr.) Krombh. - Hamilton Co.
M. esculenta L. ex Fr. - Hamilton, Jackson Cos.
M. hybrida (Sow. ex Fr.) Sacc. - Hamilton Co.
Verpa conica (Müll. ex Fr.) Fr. - Hamilton, Highland Cos.

BASIDIOMYCETES

Agaricales

Thelephoraceae

Aleurodiscus oakesii (Berk. & Curt.) Cke. on bark of Salix spp. - Adams, Clinton, Hamilton Cos.
Coniophora cerebella Pers. on rotting Quercus sp. - Hamilton Co.
Corticium caeruleum Schrad. ex Fr. - Hamilton Co.
C. ochraceum Fr. - Warren Co.
C. roseum Pers. ex Fr. on rotting wood and bark of Acer, Carya, etc.
Craterellus cornucopoides (L. ex Fr.) Pers. - Highland Co.
Cyphella galeata Schum. ex Fr. on Thuidium and Polytrichum - Clermont, Hamilton Cos.
Hymenochaete cinnamomea (Pers.) Bres. - Clermont Co.
H. corrugata (Fr.) Lév. - Hamilton, Hocking, Jackson Cos.

Thelephoraceae cont.

Hymenochaete episphaeria (Schw.) Mass. - Clermont Co.
H. fuliginosa (Pers.) Bres. - Clermont, Hamilton Cos.
H. rubiginosa Dicks. ex Lév. - Adams, Clermont, Greene, Hamilton, Jackson, Ross, Scioto Cos.
H. tabacina Sow. ex Lév. - Adams Co.
Hypochnus ferruginosus Pers. ex Fr. - Hamilton Co.
H. fumosus Fr. - Clermont Co.
H. fuscus Pers. ex Fr. - Hamilton Co.
H. isabellinus Fr. - Clermont Co.
H. subvinosus Burt - Adams, Hamilton Cos.
Peniophora cinerea (Pers.) Cke. - Clermont, Hamilton, Ross, Warren Cos.
P. thujae Burt on Juniperus virginiana L. - Clermont, Hamilton Cos.
P. viticola (Schw.) Höhn. & Litsch. on living Vitis sp. - Hamilton, Highland Cos.
Stereum albobadium (Schw.) Fr. - Adams, Clermont, Hamilton, Jackson Cos.
S. burtianum Pk. - Clermont Co.
S. cinerascens (Schw.) Mass. on Quercus spp. - Adams, Clermont, Hamilton Cos.
S. diaphanum (Schw.) Cke. - Highland Co.
S. gausapatum Fr. - Adams, Hamilton, Highland, Jackson Cos.
S. fasciatum Schw. - Clermont, Hamilton Cos.
S. frustulosum Pers. ex Fr. on Quercus spp. - Adams, Greene, Hamilton, Jackson Cos.
S. fuscum Schrad. ex Quel. - Clermont, Hamilton, Highland Cos.
S. hirsutum Willd. ex Fr. - Adams, Clermont, Jackson, Scioto Cos.
S. lobatum (Kze.) Fr. - Adams, Clermont, Hamilton, Jackson, Ross Cos.
S. murrayi (Berk. & Curt.) Burt on Carya sp. - Hamilton Co.
S. purpureum Pers. - Hamilton Co.
S. rameale Schw. - Adams, Clermont, Hamilton, Ross Cos.
S. rufum Fr. on Fagus - Clermont Co.
S. rugosiusculum Berk. & Curt. - Hamilton, Ross Cos.
S. sericeum Schw. - Adams, Clermont, Hamilton, Highland, Hocking, Jackson Cos.
S. umbrinum Berk. & Curt. - Clermont, Hamilton Cos.
S. versicolor Sw. ex Fr. - Brown, Clermont, Hamilton Cos.
Thelephora albidobrunnea Schw. - Champaign, Highland, Jackson Cos.
T. caespitulans Schw. - Hamilton Co.
T. cuticularis Berk. - Highland Co.
T. intybacea Pers. ex Fr. - Hocking Co.
T. palmata Scop. ex Fr. - Brown, Hamilton, Highland Cos.

Hydnaceae

Auriscalpium vulgare S. F. Gray on cones of Pinus sylvestris L. - Hamilton Co.
Calodon scrobiculatum (Fr.) Quel. - Hamilton Co.

Hydnaceae cont.

Calodon velutinum (Fr.) Quel. - Adams, Highland Cos.
C. zonatum (Fr.) Quel. - Highland Co.
Dentinum repandum (Fr.) S. F. Gray - Adams, Hamilton, Highland Cos.
Hericium coralloides Scop. ex S. F. Gray - Hamilton, Highland Cos.
H. erinaceum (Fr.) Pers. on Quercus - Brown, Clermont, Hamilton Cos.
H. laciniatum Leers ex Banker on Acer and Carya logs - Hamilton, Highland Cos.
Hydnellum complicatum Banker - Hocking Co.
H. nuttallii Banker - Hocking Co.
Hydnum albomagnum Banker - Hocking Co.
Odontia arguta (Fr.) Quel. - Clermont, Hamilton Cos.
O. fimbriata Fr. - Clermont Co.
O. fusco-atra (Fr.) Bres. - Clermont Co.
O. setigera (Fr.) L. W. Miller - Hamilton Co.
Oxydontia fragillissima (Berk. & Curt.) L. W. Miller - Clermont, Hamilton Cos.
O. setosa (Pers.) L. W. Miller on Pyrus malus L. in abandoned orchards - Clermont, Hamilton Cos.
Phellodon cyathiformis Karst. - Hocking Co.
Radulum orbiculare Fr. - Hamilton Co.
R. pallidum Berk. & Curt. - Clermont, Hamilton, Warren Cos.
Steccherinum adustum (Schw.) Banker - Adams Co.
S. ochraceum (Fr.) S. F. Gray - Clermont, Hamilton, Jackson Cos.
S. pulcherrimum (Berk. & Curt.) Banker - Highland Co.
S. rawakense (Pers.) Banker - Clermont Co.
S. septentrionale (Fr.) Banker - Clermont, Hamilton, Highland Cos.

Agaricaceae

Cantharelleae

Cantharellus aurantiacus Fr. - Hamilton Co.
C. cibarius Fr. - Brown Co.
C. cinnabarinus Schw. - Clermont, Highland Co.
C. floccosus Schw. - Hocking Co.

Coprineae

Coprinus atramentarius Fr. - Hamilton, Highland Cos.
C. fimetarius Fr. - Hamilton Co.
C. micaceus Fr. - Hamilton Co.
C. plicatilis Fr. - Clermont, Hamilton Cos.
C. silvaticus Pk. - Hamilton Co.

Hygrophoreae

Hygrophorus cantharellus Schw. - Hocking Co.
H. conicus Fr. - Brown, Hamilton Cos.
H. miniatus Fr. - Clermont Co.

Hygrophoreae cont.

Hygrophorus puniceus Fr. - Hamilton Co.
H. serotinus Pk. - Hamilton Co.

Lactarieae

Lactarius atroviridis Pk. - Hocking Co.
L. cinereus Pk. - Highland Co.
L. deliciosus Fr. - Hocking Co.
L. distans Pk. - Hocking Co.
L. insulsus Fr. - Hocking Co.
L. piperatus Fr. - Brown, Highland Cos.
Russula aeruginea Lindb. - Hocking Co.
R. alutacea Fr. - Hamilton Co.
R. amygdaloides Kauf. - Clinton Co.
R. atropurpurea Pk. - Clermont, Highland Cos.
R. lilacea Quel. - Hamilton Co.
R. mariae Pk. - Warren Co.
R. ochrophylla Pk. - Clermont Co.
R. rubra Fr. - Clermont, Hamilton Co.
R. subsordida Pk. - Hamilton Co.
R. virescens Fr. - Hamilton Co.

Marasmiae

Lentinus vulpinus Fr. - Clermont, Hamilton Cos.
Marasmius androsaceus Fr. - Hamilton Co.
M. calopus Fr. - Clermont Co.
M. candidus Fr. - Clermont Co.
M. capillaris Morg. - Clermont, Hamilton, Highland Cos.
M. delectans Morg. - Hamilton Co.
M. fagineus Morg. - Clermont Co.
M. longipes Pk. - Warren Co.
M. velutipes Berk. & Curt. - Clermont, Hamilton, Highland Cos.
Panus rudis Fr. - Clermont, Hamilton Cos.
P. stipticus Fr. - Adams, Clermont, Clinton, Hamilton, Jackson Cos.
P. strigosus Berk. & Curt. - Hamilton Co.
P. torulosus Fr. - Highland Co.

Agariceae

Leucosporeae

Amanita caesaria Fr. - Hamilton Co.
A. flavoconia Atk. - Hocking Co.
A. muscaria Fr. - Highland Co.
A. phalloides Fr. - Highland Co.
A. rubescens Fr. - Warren Co.
A. strobiliformis Vitt. - Highland Co.

Leucosporeae cont.

Amanitopsis vaginata Fr. - Clermont, Hamilton, Hocking Cos.
Armillaria mellea Fr. - Clermont, Hamilton, Highland, Warren Cos.
Clitocybe candicans Fr. - Hamilton, Ross Cos.
C. clavipes Fr. - Hocking Co.
C. illudens Schw. - Hamilton, Warren Cos.
C. monadelpha Morg. - Adams, Hamilton, Ross Cos.
C. multiceps Pk. - Clermont, Hamilton Cos.
C. nebularis Fr. - Clermont, Hamilton Cos.
C. ochropurpurea Berk. - Highland Co.
C. odora Fr. - Hamilton, Warren Cos.
Collybia acervata Fr. - Hamilton, Highland Cos.
C. amabilipes Pk. - Highland Co.
C. butyracea Fr. - Clermont Co.
C. confluens Fr. - Ross Co.
C. dryophila Fr. - Champaign, Hamilton Cos.
C. longipes Fr. - Clermont Co.
C. platyphylla Fr. - Hamilton Co.
C. radicata Fr. - Clermont, Hamilton Cos.
C. velutipes Fr. - Adams, Brown, Clermont, Hamilton Cos.
Lepiota felina Fr. - Hocking Co.
L. morgani Pk. - Highland Co.
L. naucina Fr. - Hamilton Co.
L. procera Fr. - Clermont Co.
L. rufescens Morg. - Warren Co.
Mycena acicula Fr. - Clermont Co.
M. corticola Fr. - Clermont, Hamilton Cos.
M. epipterygia Fr. - Clermont, Hamilton, Highland Cos.
M. filopes Fr. - Hamilton Co.
M. galericulata Fr. - Adams, Clermont, Champaign Cos.
M. haematopoda Fr. - Hamilton Co.
M. leaiana Berk. - Brown, Clermont, Hamilton Cos.
M. prolifera Fr. - Hamilton Co.
Omphalia campanella Fr. - Highland, Jackson Cos.
O. epichysium Fr. - Highland Co.
O. pyxidata Fr. - Clermont Co.
Pleurotus applicatus Fr. - Clermont, Hamilton, Jackson Cos.
P. atropelitus Pk. - Adams, Hamilton Cos.
P. mastrucatus Fr. - Clermont Co.
P. ostreatus Fr. - Adams, Brown, Clermont, Hamilton Cos.
P. petaloides Fr. - Hamilton Co.
P. sapidus Kalchbr. - Adams, Brown, Clermont, Hamilton Cos.
P. ulmarius Fr. on Ulmus americanus L. - Clermont Co.
Tricholoma album Fr. - Hocking Co.
T. cinerascens Fr. - Hamilton Co.
T. grande Pk. - Hamilton Co.
T. personatum Fr. - Clermont, Hamilton, Highland Cos.
T. transmutans Fr. - Clermont Co.

Rhodosporeae

Claudopus nidulans Fr. - Clermont, Hamilton Cos.
Clitopilus abortivus Berk. & Curt. - Adams, Clermont, Warren Cos.
Pluteus cervinus Fr. - Champaign, Clermont, Hamilton, Highland, Hocking, Jackson Cos.
Volvaria bombycina Fr. - Highland Co.
V. pusilla (Pers.) Fr. - Hamilton Co.
V. umbonata Pk. - Clermont Co.

Ochrosporeae

Cortinarius armillatus Fr. - Adams Co.
C. cinnamomeus Fr. - Hamilton, Hocking, Ross Cos.
C. hemitrichus Fr. - Clermont Co.
C. lilacinus Pk. - Hamilton Co.
C. violaceus Fr. - Hamilton Co.
Crepidotus croccophyllus Berk. - Hamilton Co.
C. dorsalis Pk. - Hamilton Co.
C. latifolius Pk. - Hamilton Co.
C. mollis Fr. - Hamilton Co.
C. versutus Pk. - Clermont, Hamilton Cos.
Hebeloma albidulum Pk. - Hamilton Co.
Inocybe subochracea Pk. - Hamilton Co.
Pholiota adiposa Fr. - Athens Co.
P. marginata Fr. - Clermont, Hamilton Cos.
P. squarrosa Fr. - Brown, Hamilton, Highland Cos.

Amaurosporeae

Agaricus arvensis Fr. - Hamilton Co.
A. campestris Fr. - Brown, Hamilton Cos.
A. subrufescens Pk. - Hamilton, Ross Cos.
A. sylvaticus Fr. - Hamilton Co.
Hypholoma incertum Pk. - Hamilton, Highland, Hocking Cos.
H. sublateritium Fr. - Adams, Brown, Clermont, Hamilton, Highland Cos.
Strophoria stercoraria Fr. - Clinton Co.

Melanosporeae

Panaeolus campanulatus Fr. - Hamilton Co.
P. solidipes Pk. - Clermont Co.

Gasteromycetes

Calostomataceae

Astraeus hygrometricus (Pers.) Morg. - Hamilton, Highland Cos.

Lycoperdaceae

Bovista pila Berk. & Curt. - Hamilton Co.
B. plumbea Pers. - Hamilton, Highland Cos.
Bovistella ohiensis Ell. & Morg. - Highland Co.
Calvatia caelata (Bull.) Morg. - Clermont, Hamilton, Highland Cos.
C. craniiformis (Schw.) Fr. - Adams, Hamilton Cos.
C. cyathiformis (Bosc) Morg. - Adams, Hamilton Cos.
C. maxima (Schaeff.) Morg. - Clermont Co.
Disciseda candida (Schw.) Lloyd - Clermont Co.
Geaster triplex Jungh. - Hamilton, Highland Cos.
G. rufescens Pers. - Clermont, Highland Cos.
Lycoperdon gemmatum Batsch - Adams, Brown, Clermont, Hamilton, Highland Cos.
L. pedicellatum Pk. - Warren Co.
L. pyriforme Schaeff. - Adams, Clermont, Hamilton, Highland Cos.

Nidulariaceae

Crucibulum vulgare Tul. - Adams, Clermont, Hamilton Cos.
Cyathus stercoreus (Schw.) DeT. on manure - Clermont, Hamilton Cos.
C. striatus Willd. on humus - Clermont, Hamilton Cos.

Phallaceae

Dictyophora duplicata (Bosc) E. Fischer - Hamilton Co.
Mutinus ravenelii (Berk. & Curt.) E. Fischer (M. caninus) - Hamilton, Warren Cos.
Ithyphallus ravenelii (Berk. & Curt.) E. Fischer - Hamilton Co.

Sclerodermataceae

Scleroderma aurantium (Vaill.) Pers. - Hamilton, Hocking, Jackson Cos.

Tylostomataceae

Tylostoma verrucosum Morg. - Clermont, Hamilton Cos.

(R. R. 2, LOVELAND, OHIO).

BRIEF NOTES ON PLANT DISEASES

VERTICILLIUM WILT OF COTTON IN TENNESSEE: For the purpose of increasing the seed supply of certain pure line selections, 18 small isolated blocks of cotton were planted in 1942 in the vicinity of Knoxville, Tennessee. Plants affected with verticillium wilt (Verticillium albo-atrum) were found in 5 of these fields. The number of diseased plants ranged from a trace to about 5%. Several soil types were represented. The history of these fields indicates that cotton had never been grown in any of them. However,

at least 4 had been planted with truck crops. The seed used in all of the cotton plantings were obtained from the 1941 crop grown at the U. S. Cotton Field Station, Knoxville, Tennessee where verticillium wilt has not been observed.
(Paul R. Miller, Cotton and Other Fiber Crops and Diseases).

CHECK LIST REVISION

Freeman Weiss

WASHINGTONIA (PALMACEAE)

WASHINGTONIA FILIFERA Wendl., CALIFORNIA WASHINGTON PALM, and W. ROBUSTA Wendl., MEXICAN WASHINGTON PALM. Tall fan-palms, indigenous to S. California and Mexico, grown for ornament and shade chiefly in Calif. and Fla.

Auerswaldia sp., leaf spot. Calif.
Cercospora sp., leaf spot. Fla.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum sp., leaf spot. Fla.
Cylindrocladium macrosporium Sherb., leaf spot. Fla.
Euryachora neowashingtonianae Dearn., on leaf stalks. Fla.
Graphiola phoenicis (Moug.) Poit., false smut. Fla., Texas.
Heterodera marioni (Cornu) Goodey, root knot. Ariz., Fla.
Metasphaeria washingtoniae Earl, on dead leaves. Calif.
Mycosphaerella washingtoniae Rehm, on leaves. Calif.
Omphalia pigmentata Bliss and O. tralucida Bliss, on decaying leaf bases. Calif. (Both species have been shown to be pathogenic to roots of seedlings but have not been reported as naturally infecting this host.)
Penicillium vermoeseni Biourge, bud rot. Calif.
Pestalotia palmarum Cke., leaf spot. Fla.
Phaeochora neowashingtoniae (Shear) Theiss. & Syd., on leaf stalks. Calif.
Phoma palmicola Wint., on leaves, ? leaf spot. Texas.
Phomopsis sp., on leaves. Texas.
P. pritchardiae (Cke. & Hark.) Sacc. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Phytophthora sp., bud rot. Ariz.
Pythium sp., wilt. Fla.

WEIGELA (CAPRIFOLIACEAE)

*WEIGELA spp. Flowering shrubs of E. Asia, the garden forms of which are complex hybrids chiefly derived from W. FLORIDA (Sieb. & Zucc.) ADC., W. FLORIBUNDA (Sieb. & Zucc.) C.A. Mey, W. CORAEENSIS Thunb. and W. JAPONICA Thunb.; cult. Zones V-VI.

* Frequently misspelled Weigelia; specific names of fungi based on the misspelling of the host name are corrected here.

WEIGELA spp. cont.

Agrobacterium tumefaciens (EFS. & Town.) Conn, crown gall. Md., Miss.
Cercospora weigelae Ell. & Ev., leaf spot. Md., Miss.
Diplodia weigelae Sacc., on twigs. N. Y.
Heterodera marioni (Cornu) Goodey, root knot. Calif., Md., Miss., Texas.
Mycosphaerella weigelae Fairm., on leaves. Ga., Miss., N. Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Ramularia diervillae Pk., leaf spot. Tenn.

WHIPPLEA (SAXIFRAGACEAE)

WHIPPLEA MODESTA Torr. Trailing shrub of Growth Regions 1 & 4, sometimes planted for ornament, Zone VII.

Peronospora whippleae Ell. & Ev., downy mildew. Calif.

WISTARIA (LEGUMINOSAE)

*WISTARIA spp. Chiefly W. FLORIBUNDA (Willd.) DC., JAPANESE WISTARIA, and W. SINENSIS (Sims) Sweet, CHINESE W. Woody vines or twining shrubs, cult. for ornament, the former hardy in Zone IV, the latter in V.

Agrobacterium tumefaciens (EFS. & Town.) Conn, crown gall. Conn., Md.
Botryosphaeria wistariae (Rehm) Sacc., on stems. S. Car. (?Physalospora obtusa).
Camarosporium wistarianum Fairm., on stems. N. Y.
Cytoploea subconcava (Schw.) Starb., on dead stems. Pa.
Erysiphe sp. (? cichoracearum DC.), powdery mildew. Texas.
Haplosporella wistariae Ell. & Barth., on stems. Kans., N. Y.
Hendersonia wistariae Cke., on stems. S. Car.
Heterodera marioni (Cornu) Goodey, root knot.
Mycosphaerella sp., on leaves. S. Car.
Nectria cinnabarina Tode ex Fr., on stems, ? canker. Conn.
Phomopsis seposita (Sacc.) Trav., on stems. Mass. (Probably related to Diaporthe eres Nits.)
Phyllosticta wistariae Sacc., leaf spot. Mass., Mo., N. J., Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on stems. N. Y., S. Car.
Pleurotus sp., heart rot. W. Va.
Septoria wistariae Tharp, leaf spot. Texas. (S. wistariae Brun., in Europe, has priority).
Mosaic, ? virus. Miss., N. Y.

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* The spelling Wisteria is generally held to conform to International Rules, but Wistaria is used by Standardized Plant Names and Webster's International Dictionary.

WISTARIA FRUTESCENS (L.) Poir., AMERICAN W., woody vine of the S. E. and Gulf States, sometimes grown for ornament.

Phomatospora wistariae Ell. & Ev. Ill.
Phyllosticta wistariae Sacc., leaf spot. Texas.
Septoria wistariae Tharp, leaf spot. Texas. (? S. wistariae Brun.)

XANTHORHIZA (RANUNCULACEAE)

XANTHORHIZA SIMPLICISSIMA Marsh., YELLOWROOT. Low shrub of Growth Regions 27, 28, 29, 30, used for ground cover and ornament.

Phyllosticta xanthorhizae Ell. & Nutt., leaf spot. W. Va.

ZANTHOXYLUM (RUTACEAE)

ZANTHOXYLUM AMERICANUM Mill., COMMON PRICKLY-ASH. Shrub or small tree of Growth Regions 22, 23, 24, 25, 26, 27, 29, 30; important food of wildlife.

(Aecidium xanthoxyli Pk.): Puccinia andropogonis Schw. var. xanthoxyli Arth.
Cercospora xanthoxyli Cke., leaf spot. Ind., Texas.
Dermatea xanthoxyli Pk., on dead branches. N. Y.
Diplodia natalensis Pole-Evans, stem canker. Texas.
Discula xanthoxyli Ell. & Ev., on dead branches. La.
Fomes igniarius (L. ex Fr.) Kickx, white heart rot.
Macrophoma xanthoxyli Ell. & Ev., on branches. La.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Widespread.
Puccinia andropogonis Schw. var. xanthoxyli (Pk.) Arth., rust (O, I). Iowa, Kans., Mo., Nebr., Texas, Wis. (II & III on Andropogon spp.)
Septoria pachyspora Ell. & Holw., leaf spot. Iowa, Nebr.
Thyronectria xanthoxyli (Pk.) Ell. & Ev., on stems. Mich., N. Y.

ZANTHOXYLUM CLAVA-HERCULIS L., HERCULES' CLUB. Small tree of Growth Regions 20, 22, 25, 28, 29, 30.

Cercospora xanthoxyli Cke., leaf spot. Fla., Ga., Texas.
Periconia lateralis Ell. & Ev., on leaves. Texas.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Texas.
Puccinia andropogonis Schw. var. xanthoxyli (Pk.) Arth., rust (O, I). Texas.
Septoria pachyspora Ell. & Holw., leaf spot. Texas.

ZANTHOXYLUM FAGARA (L.) Sarg., LIME PRICKLY-ASH. Small evergreen tree of Growth Regions 11, 17, 32.

Ovulariopsis farinosa Syd., powdery mildew. Fla.